Cerebral Atrophy

Clinical Manifestations in Adults

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• *A study was made of the cases of 200 patients with demonstrated cerebral atrophy. In patients under 70 years of age cerebral atrophy was twice as common in men as women. Over 70 years the ratio was reversed. The incidence of cerebral atrophy was relatively high in the age group 35 to 50.*

Convulsions were present in more than a third of the 200 patients. Neurological abnormalities were present in 51 per cent of the entire series. Significant personality deviations were observed in 31 per cent. Although the electroencephalogram was abnormal in many patients, it appeared to be of little aid in the diagnosis of the cerebral atrophy. The spinal fluid did not seem to be consistently altered in any significant or diagnostic manner.

Most of the patients in the 35 to 50 year age group did not have the symptoms characteristic of Alzheimer's disease, and in only a few cases did the symptoms resemble those of other recognized disease entities.

A GREAT DEAL of attention has been given to senile and presenile cerebral atrophy and to the shrinking of the brain incident to deleterious influences at birth or in early life, but the atrophic conditions of the brain occurring in the robust years of adulthood appear to have been largely ignored. Moreover, when such conditions are recognized in persons of the middle years there has been a tendency to classify them as "presenile." In this connection a question that might well be raised is: When does senility begin?

Impressed with the relative frequency with which atrophy is encountered in persons between 25 and 50 years of age, the author reviewed the clinical records of 200 patients with a diagnosis of cerebral atrophy. In the records of the last ten years at the Los Angeles County General Hospital, 100 were found in which significant atrophy was demonstrated either by pneumoencephalogram or by autopsy. The age range was from 22 to 93 years. From the records of the White Memorial Hospital, another 100 case studies were selected of patients between the ages of 25 and 55 years in whom significant atrophy had been demonstrated by either pneumoencephalogram or ventriculogram or both. For the sake of brevity, hereafter the Los Angeles County General Hospital series will be designated as the first series and the White Memorial Hospital series as the second series.

Age: In the first series, in which the age range was from 22 to 93 years, there were 61 men and 39 women and in the second series with patients of ages from 25 to 55 years there were 65 men and 35 women (Table 1). A ratio of about two men to one woman was quite constant through to the age of 70 years, but above that age the ratio was reversed. It is of interest that the greatest incidence of atrophy in the first series was in the age group of 40 to 49 years (27 per cent of cases were in that group) and in the second series the highest incidence (39 per cent of cases) was in the 35 to 45 age group.

Convulsions: The most constant clinical manifestations in patients up to the age of 55 years was convulsions (Table 2). In the first series there were 37 patients with convulsions and only four of them were over 50 years of age. In the second series 42 had convulsions. The incidence was high enough in both series to warrant a conclusion that cerebral atrophy should be considered in the differential diagnosis of a convulsive disorder beginning in adulthood without apparent cause.

Personality Disorders: The frequency of gross personality deviations in this rather large group of patients was less than one might expect. Significant personality deviations were observed in 40 of the patients in the first series and in 22 of those in the second series (Table 3). In the first group, 17 were psychotic, 15 were deteriorated, and eight were severely neurotic. In the other group there were no psychotic patients, only seven with deterioration and 15 with severe neurosis. In both series the incidence of deterioration was highest in the older age group. More than half of the psychotic patients were over 60 years of age. While 36 per cent of the 200 patients had serious mental deviations, the incidence in the

Presented before the Section on Psychiatry and Neurology at the 82nd Annual Session of the California Medical Association, Los Angeles, May 24-28, 1953.

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TABLE 1.—*Age and sex of patients with cerebral atrophy*

Los Angeles County General Hospital Series:

Age	Male	Female	Total
20-29	1	2	3
30-39	2	4	6
40-49	19	8	27
50-59	13	7	20
60-69	17	4	21
70-79	3	5	8
80	6	9	15
	61	39	100

White Memorial Hospital Series:

Age	Male	Female	Total
25-34	20	5	25
35-44	19	20	39
45-54	26	10	36
	65	35	100

TABLE 2.—*Incidence of convulsions in patients with cerebral atrophy*

Los Angeles County General Hospital Series:

Age	No. Patients	Convulsions	Per Cent
20-29	3	2	66
30-39	6	4	66
40-49	27	15	55
50-59	20	12	60
60-69	21	2	10
70-79	8	2	25
80	15	0	0
	100	37	37

White Memorial Hospital Series:

Age	No. Patients	Convulsions	Per Cent
25-34	25	7	28.9
35-44	39	19	48.7
45-54	36	16	44.4
	100	42	42

TABLE 3.—*Incidence of personality deviations in association with cerebral atrophy*

Los Angeles County General Hospital Series:

Age	No. Patients	Neurosis	Deterioration	Psychosis	Total
20-29	3	0	0	2	2
30-39	6	1	0	0	1
40-49	27	4	0	2	6
50-59	20	2	3	3	8
60-69	21	1	3	7	11
70-79	8	0	2	0	2
80	15	0	7	3	10
	100	8	15	17	40

White Memorial Hospital Series:

Age	No. Patients	Neurosis	Deterioration	Psychosis	Total
25-34	25	0	2	0	2
35-44	39	8	2	0	10
45-54	36	7	3	0	10
	100	15	7	0	22

middle adult age group, with which this presentation is primarily concerned, was only about 25 per cent.

Abnormal Neurological Findings: Definite neurological abnormality was observed in 102 of the 200 patients—54 in the first group and 48 in the second. The signs varied in severity from abnormal reaction of a toe on one foot to spastic weakness of all four extremities. The two most common clinical combinations were unilateral signs referrable to the upper motor neuron beginning in one extremity and spreading to the other on the same side, and spastic weakness of both lower extremities. In many instances the signs and symptoms mimicked those of a space-taking intracranial lesion. Abnormal sensory findings were much less frequent than motor disturbance. In some five patients with demonstrated cerebellar atrophy signs referrable to the cerebellum were present. In a few patients the clinical picture resembled that of multiple sclerosis.

LABORATORY DATA

Electroencephalography: Electroencephalographic studies were carried out in 33 cases in the first group and in 27 cases the tracings were abnormal. In the second group electroencephalograms were made in 52 cases and the tracings were abnormal in 39. Although the incidence of abnormalities was somewhat greater in patients with convulsions and neurologic abnormalities and many times focal dysrhythmias were present in patients with lateralized neurologic deficits, this usually was of little help in the overall diagnosis; in many cases it only further confused the issue by helping to complete a diagnostic picture of a tumor where only atrophy existed. The degree of atrophy seemed to have little effect on the electroencephalogram; sometimes tracings were normal even in the presence of gross atrophy.

Spinal Fluid: Studies of the spinal fluid are of little help in the diagnosis of cerebral atrophy aside from the fact that if much is withdrawn when the patient is being prepared for pneumoencephalographic studies, the extraordinary volume indicates the brain must be smaller. There was no consistent variation in the spinal fluid pressure. The number of cells in the fluid was normal in most patients except those in whom it could be explained otherwise. There was pronounced variation in total protein content with a tendency to be a little higher than normal in most instances. A normal colloidal gold curve was the rule. In two cases in the second series there was a rise in the first zone, and in two others a rise in the middle zone, but without apparent reason.

Roentgen studies after introduction of air, such as pneumoencephalograms and ventriculograms, or both, appear to be the only satisfactory means of diagnosing cerebral atrophy during life.

DISCUSSION

Alzheimer's disease is generally accepted as a presenile dementia, a disease of later middle life, most common between the ages of 50 and 60 years and at times as early as the age of 40 years. It is characterized by slowly progressive psychic changes such as impaired memory, confusion, excitement, restlessness, hallucinations and deterioration to the extent that the patient is nearly a vegetable. Often associated with the mental changes are abnormal neurological findings and convulsions. The brain shows generalized cortical atrophy of varying extent, but in true Alzheimer's disease, senile plaques and degenerative fibrillary changes in the ganglion cells of the cortex must be found on histologic examination. The cause of this condition is unknown.

In only a few of the 100 cases in the second series were the clinical conditions at all suggestive of Alzheimer's disease. Only 22 of the patients had personality deviations of any major degree, and 15 of the 22 were psychoneurotic. Only seven had mental deterioration. It is somewhat difficult to fit the other 78 cases into the picture of the precocious senility of Alzheimer, and even harder to reconcile them with descriptions of Pick's disease. The disease that was observed in those cases could be named the *idiopathic cerebral atrophy of the adult.* However, this does not accomplish much, for Alzheimer's disease is also idiopathic as far as present knowledge is concerned. Several authorities feel that the histologic changes in the brain, upon which the diagnosis of Alzheimer's disease is made, are not specific for the disease and are found under other circumstances. At least one case was reported in a patient as young as 15 years. It is the author's conviction that most of the cases in the two series herein reported upon were not Alzheimer's disease. This applies especially to the second series, in which some of the patients had head injuries, others drank much spirits, three had had syphilis in early life (but had no indications of the disease at the time of the study). In a few cases vascular diseases may have been an etiologic factor, and no doubt a few of the patients had Alzheimer's disease. But what is the basic etiologic factor in the others?

It is altogether possible that the "Alzheimer's disease" in persons who can walk abroad has different clinical manifestations than the Alzheimer's disease that has been studied in institutions and has been recorded in the literature.

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